UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

1-4-35

REPORT OF TIMBER STAND IMPROVEMENT

EXPERIMENTAL FOREST, IDAHO CITY

BY

T. C. PENDER
Estimator

M—5123

U. S. GOVERNMENT PRINTING OFFICE: 1930

8—7417

REPORT OF TIMBER STAND IMPROVEMENT EXPERIMENTAL FOREST, IDAHO CITY

INTRODUCTION

Methods of timber stand improvement were studied on the experimental forest near Idaho City during the last week in August and first two weeks in September, 1934. The scope of the investigations included (1) development of methods of thinning and other timber stand improvements suitable for application on the national forests of this region as an extensive program; (2) determination of the cost of operation of such an undertaking, and (3) permanent establishment of a number of thinned plots for future observations.

LOCATION OF AREA

The area selected for the experimental thinnings is on the experimental forest 6 miles from Idaho City, Idaho, and is in the lower portion of 2 small drainage units, on the west side of Bannock Creek.

The eastern boundary is a chain and a half west of the $\frac{1}{4}$ corner between sections 5 and 8, T. 5N, R. 6 E., Boise Meridian. The experimental plots are contained within the area thinned and are tied into the cruise plot 19-6W of the 1933 experimental forest timber survey. (See map).

DESCRIPTION OF AREA

The treated area supports a dense stand of ponderosa pine reproduction interspersed with a number of open grassy spots. The overstory is composed of an open stand of overmature ponderosa pine with an occasional Douglas fir. Reproduction on the north slopes is a mixture of approximately 70 percent ponderosa pine and 30 percent Douglas fir. South slopes are almost entirely ponderosa pine. Openings in the reproduction stand are found near the base of many of the overstory trees. Some willow and ceanothus brush occupy other small areas and result in openings in the reproduction stand.

The topography is moderate; the slopes ranging from nearly level in the draw bottom to 22 percent (topographic) on the steeper slopes. Soil may be classified as a gravelly, sandy loam, deep and of granite origin. A small spring is located near the foot of the draw.

METHODS OF BLOCKS AND PLOTS

Five thinning blocks were laid out by compass and chain. Each block was divided into 5 plots. 2/1/4 acre each. The openings occurring in the stand were excluded from the plots as far as possible. The blocks were designated by letters, A, B, C, D and E, with the plots in each block being numbered 1 to 5. Four blocks A, B, C and D, are located in the first drainage unit with block A on the south slope, B on the north slope near the bottom of the draw, C on the same slope with B and adjacent to it near the crest of the ridge. Block D is laid

out on an east and north slope and adjacent to the west boundary of Block C. Block E is located in the draw bottom and on a north slope in the drainage to the south of the one containing the first 4 blocks. Block A is divided into a group of 4 plots and an isolated single plot. (See map).

SELECTION OF TREATMENTS

Treatment selected for each plot was made at random, each block being taken separately so as to have the distribution of methods equal and impartial. The plots in each block were tentatively numbered until the treatment to be given to each plot had been drawn from a hat. Later each plot was given a permanent number representing the treatment as follows:

Number	1	plots	-	check
"	2	"	-	10 ft. conventional
"	3	"	-	10 ft. crop tree
"	4	"	-	15 ft. " "
"	5	"	-	20 ft. " "

MECHANICS OF THE PROJECT

The crew comprised 5 CWA laborers as choppers and the writer as supervisor and tally man. The first day was spent in training of the crew by practice thinnings on areas around the plots. Snags were cut from the area on the second day. Removal of the snags before the thinning was considered necessary so that any injury occurring to the stand could be adjusted when it was thinned. Three members

of the crew were started on the thinning of the plots while the other 2 removed the snags. After the snags were cut the entire crew of 5 men were used on the thinning plots.

The 4 methods of thinning are described as follows:

1. Ten-foot conventional method.

All trees excepting those selected to be left in the final stand, were cut. Spacing of the "leave tree" was made at approximately 10-foot intervals. The "leave trees" were selected largely by their spacing in the original stand. In addition to spacing, the crown class of the tree was considered and, insofar as possible, all trees selected were dominant even to the extent of somewhat interrupting the desired spacing. In some cases it was desirable to discriminate against a dominant tree in favor of a codominant tree, since by removing the dominant trees codominants would be released whereas, if the dominant were left, removal of both codominants would have to be made. Selection of codominant trees as "leave trees" or "crop trees" was necessary in some cases to secure the desired spacing. No injured or defective tree was selected as a crop tree if it was possible to do otherwise. Where the porcupine injury was exceedingly heavy and it was impossible to find an uninjured tree, it was necessary in some cases to select a damaged tree as a crop tree in order to avoid opening the stand too much and thus drastically exposing the site. The Douglas fir was discriminated against except in case of an exceptionally fine tree

located on the desired spacing. In the selection of every crop tree, an effort was made generally to obtain the best possible spacing with the best possible trees.

2. Ten-foot Crop Tree.

Trees were selected on the same basis as described above. The crop trees were spaced at 10-foot intervals. Instead of removing all the trees except the crop trees, only enough of the other trees were cut to release the crop tree from competition.

3. Fifteen-foot Crop Tree.

4. Twenty-foot Crop Trees.

Methods in 3 and 4 are the same as described under 2 except that the spacing varied as the name of the method indicates.

It was found necessary in using the last 3 methods to remove all trees so as to leave a space of approximately 3 feet, or the length of an axhandle between the crown of the crop tree and the crowns of its nearest neighbors.

No slash disposal was practiced on the thinning plots. An effort was made to prevent the slash from becoming too deep. The trees were felled as near as possible so that they would lie parallel to each other on the ground. This tended to keep the slash low as it lessens the "cribbing" effect that would have resulted if the trees were felled and left in a helter-skelter fashion. Trees more than 10 feet in length were cut into sections of from 8 to 10 feet

to afford greater ease in handling in the event of removal later. The upper heavy limbs were lopped off in a few cases.

Trees were tallied in 1-inch diameter classes as they were felled. The results of the timber stand improvement are summed up in the following table.

TOTAL FOR FIVE PLOTS ($2\frac{1}{2}$ A)

Method	Original No. Trees	Original Ave. DBH	No. Trees Cut	Ave. DBH	No. Crop Trees	Ave. DBH	Other Trees Not Cut	Ave. DBH	Man Hours
10-foot Conventional	9941	1.94	9119	1.77	822	2.92	-	-	78.3
10-foot Crop Tree	10241	1.64	8502	1.58	973	2.38	766	1.13	79.6
15-foot Crop Tree	7921	1.89	5745	1.83	543	3.33	1633	1.54	87.2
20-foot Crop Tree	8673	1.50	4836	1.49	309	2.49	3528	1.42	50.8

108 snags with an average diameter of 16.2 inches were removed from approximately 30 acres with 11 man-days labor. Besides the thinning on the plots 10.3 acres were thinned bordering the plots.

COSTS

The total cost for the project is as follows:

Equipment	
Tools (4 axes, 2 saws, 2 brush hooks, hammer, wedges)	$35.05
Axhandles	1.38
Saw filing	3.00
Labor (5 men, 16 days @ 4.80)	384.00
Overhead (16 days @ 5.50)	88.00
Total --	$511.43

RECORDS

After the thinning had been completed permanent angle-iron stakes painted white were set at the corners of each plot. Each stakes was stamped with the number of the plot and the block letter on the face toward the plot. Two stakes were necessary in several cases where four plots cornered together.

Measurements were taken of the trees left on the plots. A white spot was painted on each crop tree at breast height. Numbers 1 to 20 were painted on 20 trees in each plot in a diagonal direction across the plots, and all plots in the same block were numbered in the same direction. Besides the painted number, metal tags, the last 1 or 2 numbers of which corresponded to the painted number, were wired to a lower branch on the tree.

Measurements of the trees were made as follows:

1. A breast high measurement to the inch was made for every uncut tree on the plot. Crop trees were measured at the top of the painted spot.

2. The 20 numbered trees on each plot were measured for diameter to the nearest .1 inch at the top of the painted spot with a diameter tape.

3. A height measurement to the nearest foot was made on each numbered tree with the aid of a 16-foot rod or with an Abney level and chain.

4. When it was possible, a height growth measurement to the nearest .1 foot on each numbered tree was made for each year covering the past 5 years by bending the tree, climbing, or with the aid of the 16-foot rod.

5. When it was not possible to measure the height growth in one-year periods, the accumulative growth for the 5-year period was measured with an Abney level and chain.

Each check plot was treated as though it had been thinned to a 10-foot spacing. That is, crop trees were spotted on the check plots just as though the plots were thinned. 20 of the crop trees were numbered and measured in detail just as on the thinned plots.

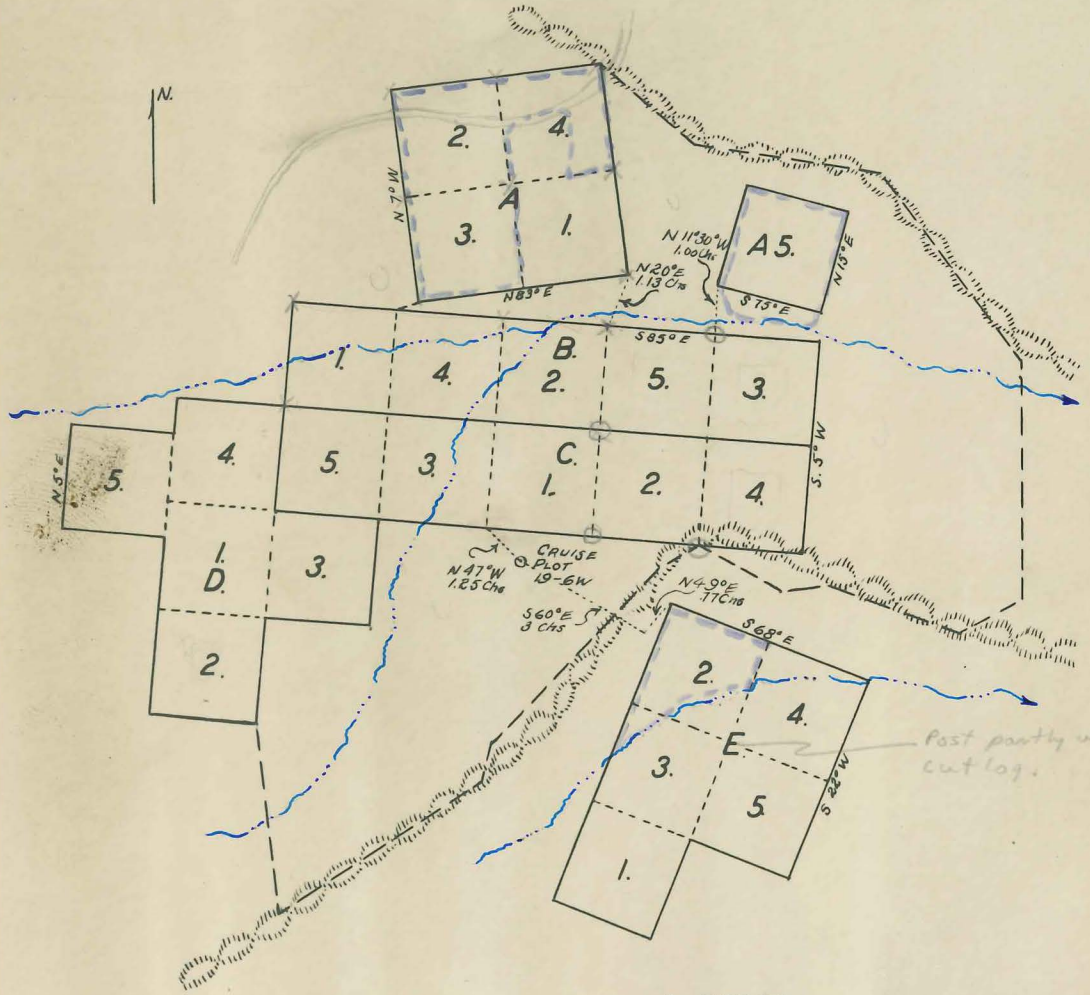
Sample forms and maps are attached to this report.

T. C. PENDER,
Estimator

TIMBER STAND IMPROVEMENT

BANNOCK CREEK

1934



1. CHECK
2. 10' CONVETIONAL
3. 10' CROP TREE
4. 15' CROP TREE
5. 20' CROP TREE

--- Slash piled & burned

Note - Plots ½ acre

x Fd 3/21/67 DLL, GBB
o Fd 5/11/67

PONDER